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NASA Procedural Requirements

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 (NASA Only)

Subject: Facility Project Requirements

Responsible Office: Facilities Engineering and Real Property Division[| TOC](#) | [Preface](#) | [Chapter1](#) | [Chapter2](#) | [Chapter3](#) | [Chapter4](#) | [Chapter5](#) | [AppendixA](#) |
[AppendixB](#) | [AppendixC](#) | [AppendixD](#) | [ALL](#) |

Chapter 2. Project Development and Planning

2.1 Facility Project Development

The Center CoF Manager shall develop a systematic process for developing projects for potential inclusion into the CoF process. At a minimum, this process shall include the following:

2.1.1 An annual call for potential projects to Center facility stakeholders.

2.1.2 A method for ongoing collection of requirements throughout the year.

2.1.3 A method for identifying operations and maintenance requirements, such as excessive trouble calls on a system or facility.

2.2 Facility Project Planning

The FAR and the NASA FAR Supplement control all of the acquisition phases for all facility project work. The FPM and Center facility planning office shall coordinate all acquisition planning and execution with the Center acquisition office to ensure compliance with these regulations.

2.2.1 Center Master Plan -- The FPM shall ensure assigned CoF projects are in accord with the Center Master Plan.

2.2.2 Facility Project Manager -- Centers will assign an FPM for each CoF project. The FPM shall, with support of a project team, organize, manage, and direct facility project work to meet the requirements of this NPR. The project team shall include all project stakeholders, such as representatives from the using organization, safety, health, engineering, fire protection, security, environmental, acquisition, operations and maintenance, and technicians.

2.2.3 Front End Planning (FEP) -- The FPM must ensure all project stakeholders take part in FEP, the process of gathering and developing sufficient information to define a facility project. Once the FPM and the planning team have identified the initial project goals and objectives, the FEP process starts and continues through the approval of the design statement of work and the start of final design. The FEP phase establishes the project requirements and concept and provides the basis for project budget and approval. The primary tool used to accomplish FEP is the Project Definition Rating Index (PDRI) (see <http://www.hq.nasa.gov/office/codej/codejx/Assets/Docs/ProjectDefinitionRatingIndex.pdf>). Initially, the FPM will use the PDRI as a checklist to determine the project areas needing clarification and further study. The FPM and the project team shall evaluate and score the project using the PDRI soon after receiving the 30-percent design documents. If at that time the PDRI score is over 200 out of 1,000 possible points, the project team will identify the problem areas and evaluate the risks to project success. If the risks are low, the project may proceed to final design. If the risks are high, the FPM will further define the project before proceeding with final design. For CoF projects receiving a PDRI score of 300 or more out of 1,000 possible points, the FPM shall prepare a written memorandum outlining the items of low definition and the reasoning behind the decision to proceed. The FPM and the Center CoF Manager must sign and date this document and keep it on file with the project documents through project closeout.

2.2.4 Facility Project Requirements -- The following are required for all facilities projects regardless of fund source:

2.2.4.1 Functional Requirements Document -- The FPM shall complete a Functional Requirements Document containing more detail than is found on the [NASA Form 1509](#). It forms the basis for developing documents for budget formulation and/or project approval. It is essential that the detailed requirements in this document are accurate and complete for use in further development of the project. After the Functional Requirements Document is written, it shall undergo a complete review by the project stakeholders including all functional offices necessary to ensure the project complies with internal and external requirements (e.g., safety, security, energy, legal, planning, acquisition, and environmental). The Functional Requirements Document shall include the following elements:

- a. A clear and concise statement of purpose for the project.
- b. Description of the project, including existing conditions, problems, potential or preliminary solutions, operational need dates, studies, user requests, reports, or Operations and Maintenance (O&M) data. (The FPM shall attach supporting documentation as appendices or at least note how and where it may be obtained).
- c. Justification for the project.
- d. The statement of work if the project development and design work will be done by contract.
- e. The funds source(s) and points of contact for those funds.

2.2.4.2 Facility Project Management Plan -- For CoF projects, The FPM shall prepare a Facility Project Management Plan that establishes a schedule for implementing a facility project and assigns roles, responsibilities, and authorities to develop and complete the project. The plan provides a detailed outline of the steps in the facility implementation process with well-defined milestones to measure progress. Prior to start of final design work, the FPM shall present the management plan for approval to the Center official exercising project technical approval authority. For discrete projects, the FPM shall submit the management plan to NASA Headquarters FERPD for review and approval. Management plan approval on discrete projects is required before start of final design (after acceptance of the 30-percent design, see paragraph 3.6.1.1 30-Percent Design). The Facility Project Management Plan shall include the following elements:

- a. Identification of the FPM, the project team members, and other individuals or organizations responsible for project implementation.
- b. Functional Requirements Document (see paragraph 2.2.4.1).
- c. Description of the planned work, including capacity, scope, location, sustainability elements, special features, and Current Cost Estimate (CCE).
- d. Identification of all safety, health, environmental, and security requirements.
- e. An acquisition plan outlining contract method and schedule that can realistically support the operational need date(s).
- f. A project schedule with key milestones for planning, environmental, design, acquisition, construction (include long-lead items; e.g., equipment items that are not typically stocked by suppliers), and activation.
- g. Configuration/change control procedures and responsibilities.
- h. Description of design review milestones, documentation, fiscal control procedures, and reporting frequency.

2.2.4.3 Environmental -- The FPM and the Center Environmental Manager shall ensure an environmental evaluation in accordance with [NPR 8580.1](#), Implementing the National Environmental Policy Act and Executive Order 12114.

2.2.4.4 Historic -- For work on existing facilities with potentially historic significance, the FPM and the CEM shall ensure the work is done in compliance with [Section 106 regulations](#), [36 CFR 800](#), [Protection of Historic Properties](#), of the National Historic Preservation Act (NHPA).

2.2.4.5 Occupational Safety and Health -- The FPM and the Center Occupational Safety and Health organization(s) shall identify safety and occupational health requirements in compliance with [NPR 8715.3](#), NASA General Safety Program Requirements and [NPR 8715.1](#), NASA Occupational Safety and Health Programs.

- a. The FPM shall prepare the Preliminary Hazard Analysis and the Preliminary Hazard List and initiate the Facility Safety Management Plan (FSMP) containing the Hazard Analysis Tracking Index (HATI) in accordance with [NASA-STD-8719.7](#), Facility System Safety Guidebook.

2.2.4.6 Security -- NASA has adopted the Interagency Security Council (ISC) criteria for use in planning and designing new construction and major renovation. The General Services Administration (GSA) Office of the Chief Architect makes these criteria available on their [Building Security Technology Web site](#).

2.2.4.7 Risk Management -- If applicable to any portion of a CoF project, the FPM shall ensure compliance with the risk management process as outlined in [NPR 8000.4](#), Risk Management Procedural Requirements. The referenced NPR describes applicability.

2.2.4.8 Energy Efficiency and Water Conservation -- The FPM shall ensure the project incorporates the energy efficiency and water conservation requirements in [10 CFR Part 434](#), Energy Code for New Federal Commercial and Multi-Family High Rise Residential Buildings; [NPR 8570.1](#), Energy Efficiency and Water Conservation; and the following:

a. **Energy Efficiency** -- The FPM shall ensure the project designer:

1. Establishes a whole building performance target that takes into account the intended use, occupancy, operations, plug loads, other energy demands, and design to earn the Energy Star7 targets for new construction and major renovation where applicable.

2. For new construction, reduce the energy cost budget by 30 percent compared to the baseline building performance rating per the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., (ASHRAE) and the [Illuminating Engineering Society of North America \(IESNA\) Standard 90.1-2004, Energy Standard for Buildings Except Low-Rise Residential](#).

3. For major renovations, reduces the energy cost budget by 20 percent from prerenovations 2003 baseline.

b. **Protect and Conserve Water** -- The FPM shall ensure the project designer:

1. For indoors, reduces the potable water consumption of latrine fixtures (e.g., showerheads, faucets, water closets, and urinals) by at least 20 percent from the baseline as calculated using the Energy Policy Act of 1992 fixture performance standards.

2. For outdoors, reduces outdoor potable water consumption by a minimum of 50 percent over that consumed by conventional means (plant species and plant densities) by using water-efficient landscape and irrigation strategies, including water reuse and recycling.

3. Minimizes storm water runoff and polluted site water runoff.

2.2.4.9 O&M -- The FPM shall coordinate all facility project designs and planning with the Center O&M organization. All designs shall comply with accepted maintenance policies, including the following:

a. The Reliability Centered Maintenance Guide for Facilities and Collateral Equipment (see http://www.hq.nasa.gov/office/codej/codejx/Assets/Docs/RCMGuide_Mar2000.pdf).

b. The Reliability Centered Building and Equipment Acceptance Guide (RCBEA, see <http://www.hq.nasa.gov/office/codej/codejx/Assets/Docs/RCB&EGuideJUL04.pdf>).

c. NPR 8831.2, Facilities Maintenance Management (see http://nodis3.gsfc.nasa.gov/displayDir.cfm?Internal_ID=N_PR_8831_002D_&page_name=main).

d. Predictive Testing & Inspection (PT&I).

e. Computerized Maintenance Management System (CMMS) requirements.

f. The FPM shall ensure that O&M manuals on the installed systems and equipment are written and that training (including certification training for complex technical systems) is accomplished. For real property systems and equipment, these costs shall be included in the CoF budget. For noncollateral equipment and systems, these costs shall be included in the activation budget (non-CoF).

2.2.4.10 Sustainability -- NASA has adopted the [U.S. Green Building Council's Leadership in Energy and Environmental Design \(LEED\)](#) as its performance measure for sustainable development. For CoF projects, all new construction and major building renovation projects planned for award after October 1, 2005, shall meet the minimum LEED Silver rating. The FPM will evaluate (risks, benefits, and costs) and provide an executive summary to FERPD identifying the additional requirements to meet a LEED Gold rating. If LEED Silver cannot be achieved on projects, the FPM will request a waiver from FERPD. The FPM must ensure compliance with Executive Order (EO) 13423, Strengthening Federal Environmental, Energy, and Transportation Management (see <http://a257.g.akamaitech.net/7/257/2422/01jan20071800/edocket.access.gpo.gov/2007/pdf/07-374.pdf>) and the following:

a. **Commissioning** -- Total building commissioning as defined in United States Green Building Council's LEED standard is required on all new construction and major renovation projects. Commissioning of installed items and associated systems on all other projects is required.

b. **Exemptions** -- Projects incapable of qualifying for LEED Silver certification (e.g., small, single system, or equipment) shall incorporate life-cycle cost sustainable design principles to the maximum extent practicable to reduce the overall life-cycle cost and minimize impacts on natural resources.

c. **Construction Waste** -- During the planning stage, local recycling and salvage operations that could process site-related waste will be identified. The designer shall incorporate into the construction contract documents to have the contractor recycle or salvage at least 50 percent of construction, demolition, and land-clearing waste, excluding soil, where markets or onsite recycling opportunities exist.

d. **Other Construction Standards** -- The FPM shall ensure compliance with the following standards or guidance:

1. **Indoor Air Quality During Construction** -- [Sheet Metal and Air Conditioning Contractors' National Association Indoor Air Quality Guidelines for Occupied Buildings under Construction, 1995](#) . After construction and prior to occupancy, a minimum 72-hour flush out with maximum outdoor air must be conducted, consistent with achieving relative humidity no greater than 60 percent. After occupancy, continue flush out as necessary to minimize exposure to contaminants from new building materials.

2. **Ventilation and Thermal Comfort** -- The current [ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy](#) , including continuous humidity control within established ranges per climate zone, and [ASHRAE Standard 62.1-2004, Ventilation for Acceptable Indoor Air Quality](#).

3. **Moisture Control** -- Moisture control strategy for controlling moisture flows and condensation to prevent building damage and mold contamination.

4. **Daylighting** -- A minimum daylight factor of two percent (excluding all direct sunlight penetration) in 75 percent of all spaces occupied for critical visual tasks. Automatic dimming controls or accessible manual lighting controls and appropriate glare control must be provided.

5. **Low-Emitting Materials** -- Use of materials and products with low-pollutant emissions (e.g., volatile organic compounds), including adhesives, sealants, paints, carpet systems, and furnishings.

6. **Biobased Content** -- Use of products meeting or exceeding United States Department of Agriculture's biobased content recommendations. For other products, biobased products made from rapidly renewable resources and certified sustainable wood products must be used. (See <http://www.biobased.oce.usda.gov/fb4p/>)

7. **Ozone-Depleting Compounds** -- Eliminating the use of ozone-depleting compounds during and after construction where alternative environmentally preferable products are available, consistent with either the Montreal Protocol and Title VI of the Clean Air Act Amendments of 1990 or equivalent overall air quality benefits that take into account life-cycle impacts.

8. **Recycled Content** -- For EPA-designated products, use of products meeting or exceeding EPA's recycled content recommendations. For other products, materials with recycled content must be used such that the sum of postconsumer recycled content, plus one-half of the preconsumer content, constitutes at least 10 percent (based on cost) of the total value of the materials in the project.

2.2.4.11 **Cost Estimate** -- The FPM shall prepare or ensure their assigned CoF projects have a cost estimate. This estimate must include every element described in the project Functional Requirements Document with enough accuracy to have a reasonable expectation of project success. For CoF projects, [NASA Form 1510, Facility Project Cost Estimate](#), summarizes this estimate with sufficient detail for review. When applicable to the specific project, estimates for the following major elements are required:

- a. Site preparation, utilities, sidewalks, parking lots, and roads.
- b. Construction materials and labor.
- c. Material and equipment tests performed at the construction site or at an offsite location.
- d. Construction management services.
- e. Commissioning services during design and construction.
- f. Environmental compliance and protection.
- g. Collateral equipment.
- h. Subcontractor and general contractor cost, overhead, and profit.
- i. Insurance bonds and taxes.

2.2.4.12 **Budget and Approval Documents** -- For MRCs (see paragraph 1.1.2), the Center CoF Program or Project Manager shall submit [NASA Forms 1509 and 1510](#). In addition, discrete projects must have a budget narrative (i.e., Long Form Writeup) and a Life-Cycle Cost Analysis (LCCA) in compliance with OMB Circular A-94 using ECONPACK (<http://www.hq.usace.army.mil/cemp/e/ec/econ/econ.htm>).

2.2.5 **Codes and Standards** -- The FPM must ensure designs meet or exceed locally adopted, nationally recognized building codes and standards.

2.2.5.1 In the case where a local jurisdiction has adopted a code that is not nationally recognized, the FPM shall ensure the design meets or exceeds the International Building Code from the International Code Council.

2.2.5.2 Regardless of locally adopted building codes, the FPM shall ensure the design meets or exceeds the National Fire Protection Association requirements for electrical systems, life safety, and fire protection, detection, and suppression.

2.2.5.3 All CoF design drawings shall comply with the U.S. National Computer Aided Design Standard (see <http://www.nationalcadstandard.org/>).

2.2.5.4 For all CoF project specifications, designers shall use SpecsIntact, i.e., the Uniform Facilities Guide Specifications (UFGS) found in the Whole Building Design Guide (WBDG) (see <http://specsintact.ksc.nasa.gov/> and <http://www.wbdg.org/>). For equipment or systems not adequately specified by using the UFGS, the designer may use professional judgment.

2.2.6 **Activation Budget Formulation** -- The FPM shall include budget formulation planning for activation during the planning phase of the project. The purpose is to identify costs associated with activation and ensure funds are available at the time activation starts. The budget planning must identify all costs necessary to outfit the facility for its intended operation and the source(s) of funding (see Chapter 5, Activation for details). [NASA Form 1509](#) will include the estimated activation costs for the project. For discrete projects, the long form writeup must include the activation costs and scope.

| [TOC](#) | [Preface](#) | [Chapter1](#) | [Chapter2](#) | [Chapter3](#) | [Chapter4](#) | [Chapter5](#) | [AppendixA](#) |
[AppendixB](#) | [AppendixC](#) | [AppendixD](#) | [ALL](#) |

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